

AMENDMENTS TO THE CLAIMS

Please cancel Claims 2, 5, 11 and 14; and amend Claims 1, 3, 4, 6-10, 12, 13 and 15-19 as follows.

LISTING OF CLAIMS

1. (currently amended) A design-aiding device for designing a casting product, the device comprising:

analyzing means for analyzing solidification process based on temperature change of a melted material of the casting product in elapse of time in a three-dimensional model that corresponds to the casting product and is formed of a plurality of cells;

computing means for computing cell shrinkage porosity occurrence rates of the cells in the three-dimensional model from a result by the analyzing means with an equation where a temperature gradient of the melted material is divided by a square root of a cooling rate of the melted material;

converting means for stratifying the cell shrinkage porosity occurrence rates computed by the computing means and for converting the cell shrinkage porosity occurrence rates to specific gravity values; [[and]]

quantifying means for quantifying a region shrinkage porosity occurrence rate of a region that is to be evaluated regarding the region shrinkage porosity occurrence rate, by computing a volume with respect to each of the specific gravity values converted by the converting means, multiplying the computed volume by each of the specific gravity values to obtain a product, and then summing up, to obtain a sum, all the products corresponding to all the specific gravity values included in the region,

the quantifying means quantifying the region shrinkage porosity occurrence rate as a region specific gravity value by dividing the sum by a volume of the region; and
outputting means for outputting the region specific gravity value.

2. (cancelled)

3. (currently amended) The design-aiding device for designing a casting product according to Claim [[2]] 1,

wherein the equation includes, as an initial condition, a supply-stopping temperature at which supply of the melted material is stopped, and

wherein the supply-stopping temperature is set based on a kind of the melted material.

4. (currently amended) The design-aiding device for designing a casting product according to Claim 1, further comprising:

strata setting means for setting a number of strata of the cell shrinkage porosity occurrence rates, wherein the converting means stratifies the cell shrinkage porosity occurrence rates into the strata.

5. (cancelled)

6. (currently amended) The design-aiding device for designing a casting product according to Claim 1,

wherein the region that is to be evaluated regarding the region shrinkage porosity occurrence rate is one of a plurality of regions into which the three-dimensional model is divided.

7. (currently amended) The design-aiding device for designing a casting product according to Claim [[5]] 1, further comprising:

critical value setting means for setting a critical specific gravity value; and

determining means for determining whether the region specific gravity value is not greater than the critical specific gravity value set by the critical value setting means, and advising changing design when the region specific gravity value is determined to be not greater than the critical specific gravity value.

8. (currently amended) The design-aiding device for designing a casting product according to Claim 7,

wherein the critical value setting means sets the critical specific gravity value with respect to each of regions into which the three-dimensional model is divided.

9. (currently amended) The design-aiding device for designing a casting product according to Claim 1,

wherein the casting product includes a die-casting product using an alumina alloy.

10. (currently amended) A design-aiding method for designing a casting product, comprising:

analyzing solidification process based on temperature change of a melted material of the casting product in elapse of time in a three-dimensional model that corresponds to the casting product and is formed of a plurality of cells;

computing cell shrinkage porosity occurrence rates of the cells in the three-dimensional model from an analyzed result with an equation where a temperature gradient of the melted material is divided by a square root of a cooling rate of the melted material;

converting the cell shrinkage porosity occurrence rates to specific gravity values after stratifying the cell shrinkage porosity occurrence rates; [[and]]

quantifying a region shrinkage porosity occurrence rate of a region that is to be evaluated regarding the region shrinkage porosity occurrence rate, by computing a volume with respect to each of the specific gravity values, multiplying the computed volume by each of the specific gravity values to obtain a product, and then summing up, to obtain a sum, all the products corresponding to all the specific gravity values included in the region, wherein the region shrinkage porosity occurrence rate is quantified as a region specific gravity value by dividing the sum by a volume of the region; and

outputting means for outputting the region specific gravity value.

11. (cancelled)

12. (currently amended) The design-aiding method for designing a casting product according to Claim ~~[[11]]~~ 10,

wherein the equation includes, as an initial condition, a supply-stopping temperature at which supply of the melted material is stopped, and

wherein the supply-stopping temperature is set based on a kind of the melted material.

13. (currently amended) The design-aiding method for designing a casting product according to Claim 10, further comprising:

setting a number of strata of the cell shrinkage porosity occurrence rates, wherein the cell shrinkage porosity occurrence rates are stratified into the number of strata when the cell shrinkage porosity occurrence rates are stratified.

14. (cancelling)

15. (currently amended) The design-aiding method for designing a casting product according to Claim 10,

wherein the region that is to be evaluated regarding the region shrinkage porosity occurrence rate is one of a plurality of regions into which the three-dimensional model is divided.

16. (currently amended) The design-aiding method for designing a casting product according to Claim ~~[[14]]~~ 10, further comprising:

setting a critical specific gravity value; and

determining whether the region specific gravity value is not greater than the critical specific gravity value, and advising changing design when the region specific gravity value is determined to be not greater than the critical specific gravity value.

17. (currently amended) The design-aiding method for designing a casting product according to Claim 16,

wherein the critical specific gravity value is set with respect to each of regions into which the three-dimensional model is divided.

18. (currently amended) The design-aiding method for designing a casting product according to Claim 10,

wherein the casting product includes a die-casting product using an alumina alloy.

19. (currently amended) A computer program product embodied on a computer-readable medium for use in executing a design-aiding method for a designing a casting product, the computer program product comprising instructions of:

analyzing solidification process based on temperature change of a melted material of the casting product in elapse of time in a three-dimensional model that corresponds to the casting product and is formed of a plurality of cells;

computing cell shrinkage porosity occurrence rates of the cells in the three-dimensional model from an analyzed result with an equation where a temperature

gradient of the melted material is divided by a square root of a cooling rate of the melted material;

converting the cell shrinkage porosity occurrence rates to specific gravity values after stratifying the cell shrinkage porosity occurrence rates; [[and]]

quantifying a region shrinkage porosity occurrence rate of a region that is to be evaluated regarding the region shrinkage porosity occurrence rate, by computing a volume with respect to each of the specific gravity values, multiplying the computed volume by each of the specific gravity values to obtain a product, and then summing up, to obtain a sum, all the products corresponding to all the specific gravity values included in the region, wherein the region shrinkage porosity occurrence rate is quantified as a region specific gravity value by dividing the sum by a volume of the region; and

outputting the region specific gravity value.